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(54) Abstract Title  
**Settable mixture of polybutadiene and ground glass**

(57) A settable mixture of materials such as for use in securing paving and flooring and comprising polybutadiene and ground glass and optionally including sand and a flow enhancing solvent. The mixture is preferably bagged so as to be contained in an essentially oxygen-free atmosphere thus to suspend the setting process until the bag is opened for use.

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### **MIXTURES OF MATERIALS**

THIS INVENTION relates to settable mixtures of materials, particularly, though not exclusively, such mixtures for use in securing paving and flooring.

According to this invention a settable mixture comprises polybutadiene, and ground glass.

Any proportion from 0.1% to 99.9% of the ground glass may be replaced by dry sand. The glass particles may be of uniform size or different sizes and may be from recycled glass.

There may be additions, for example colourants and/or reinforcing material e.g. synthetic or carbon fibres.

A typical mixture has by volume of the total mixture of materials:

2 to 4% polybutadiene

0.1 to 0.4% benzene (octane 140 to 160) (Optional)

Balance % ground glass or a mixture of ground glass and dry sand.

The benzene is an example of a flow-enhancing solvent.

The mixture may be bagged so as to be contained in an essentially oxygen-free atmosphere.

The invention includes paving and flooring secured by said mixture when set and a floor surface formed of or comprising said mixture and a method of forming a floor surface comprising laying tiles with said mixture.

The invention may be performed in various ways and some specific embodiments with possible modifications will now be described by way of example.

The invention provides a mixture which may be bagged and is settable on exposure to atmosphere (oxygen) and can be used indoors or outdoors for use as a screed or for fixing or pointing paving or flooring e.g. stones, cobbles, setts, tiles, or concrete, clay or stone slabs.

The screed may form a floor surface and be walked upon, or the screed may be a layer into which tiles are laid. The term tiles is intended to include floor elements such as wood blocks, bricks, stones, cobbles, setts, concrete or clay or stone slabs, bricks, pavers, paviours.

The screed may be on a substrate e.g. concrete or on a plastics sheet (which may be apertured) which itself may be on a substrate.

In general the mixture comprises polybutadiene, and ground glass. The polybutadiene is in liquid form.

Any proportion from 0.1% to 99.9% of the ground glass may be replaced by dry sand. The glass particles may be of uniform size or different sizes and may be from recycled glass.

The term dry sand includes sand which has been kiln dried and has then absorbed water from the atmosphere.

There may be additions to the mixture, for example a colourant and/or reinforcing material.

A particularly suitable form of polybutadiene is that sold under the name Univest-S by Huls Aktiengessellschaft of Marl, Germany.

A particularly preferred sand is kiln dried silica sand of special fraction size (which may have absorbed water from the atmosphere).

Examples of the suitable mixtures are:-

- |    |           |           |  |
|----|-----------|-----------|--|
| 1. | 2% - 4%   | By volume | Polybutadiene  |
|    | 0.1-0.4%  | By volume | Aroma free benzene 140-160 (optional)  |
|    | Balance % | By volume | ground glass or a mixture of ground<br>glass and kiln dried silica sand special<br>fraction size |
| 2. | 2% - 4%   | By volume | Polybutadiene  |
|    | 0.1-0.4%  | By volume | Aroma free benzene 140-160 (optional)  |
|    | 1% - 5%   | By volume | Synthetic or carbon fibres   |
|    | Balance % | By volume | ground glass or a mixture of ground<br>glass and kiln dried silica sand special<br>fraction size |
| 3. | 2% - 4%   | By volume | Polybutadiene  |
|    | 0.1-0.4%  | By volume | Aroma free Benzene 140-160 (optional)  |
|    | 0.1%-0.5% | By volume | Dry colour pigment   |
|    | Balance % | By volume | ground glass or a mixture of ground<br>glass and kiln dried silica sand special<br>fraction size |
| 4. | 2% - 4%   | By volume | Polybutadiene  |
|    | 0.1-0.4%  | By volume | Aroma free Benzene 140-160 (optional)  |
|    | 1% - 5%   | By volume | Synthetic or carbon fibres   |
|    | 0.1%-0.5% | By volume | Dry colour pigment   |
|    | Balance % | By volume | ground glass or a mixture of ground<br>glass and kiln dried silica sand special<br>fraction size |

The mixing is done quickly and in cool conditions to avoid or limit any premature setting which would occur due to heat and exposure to atmospheric oxygen.

After mixing, the mixture is bagged, and vacuum packed to remove oxygen (air) and thus suspend the setting process until the bag is opened. The mixture may be bagged in convenient amounts.

A user may obtain individual components of the mixture separately and himself form the mixture.

**CLAIMS**

1. A settable mixture comprising polybutadiene and ground glass.
2. A settable mixture according to Claim 1, wherein the mixture comprises polybutadiene, ground glass and sand.
3. A settable mixture according to Claim 1 or Claim 2, wherein the ground glass is of uniform particle size.
4. A settable mixture according to Claim 1 or Claim 2, wherein the ground glass is formed from particles of different sizes.
5. A settable mixture according to any preceding claim, wherein the ground glass includes recycled glass.
6. A settable mixture according to any preceding claim, further including a colourant.
7. A settable mixture according to any preceding claim, further including a reinforcing material.
8. A settable mixture according to Claim 7, wherein the reinforcing material comprises synthetic and/or carbon fibres.
9. A settable mixture according to any preceding claim, including 0.1% to 0.4% benzene.

10. A settable mixture according to Claim --, wherein the benzene is an aroma-free benzene (140-160).
11. A settable mixture according to any preceding claim, bagged so as to be contained in an essentially oxygen-free atmosphere.
12. A settable mixture according to any preceding claim, in which the polybutadiene is in liquid form.
13. A settable mixture according to Claim 2, wherein the sand is kiln dried silica sand of special fraction size.
14. A settable mixture according to any preceding claim, when incorporated as a filler in spaces between paving or flooring tiles.
15. A settable mixture according to any preceding claim, when formed as a screed to form a floor surface.
16. A settable mixture according to any preceding claim, when formed as a screed upon which flooring or paving tiles are laid.



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Application No: GB 9804106.4  
Claims searched: 1-16

Examiner: Martin Price  
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**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Other: Online - WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A, P	GB 2306966 A (Castlefield)	
Y	GB 2302093 A (Resdev) - see claims and examples	1-16
Y	GB 2279957 A (Meader) - see example 1	1-16
X, Y	US 4492779 (Thiokol) - see claims 1 and 8	1-16
X, Y	WPI Accession number 83-786733[41] & JP 58149931 (Matsushita) - see abstract	1-16

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.